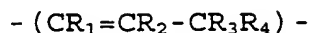


## CLAIMS

1. Polymer whose skeleton comprises a sequence of units, which may be identical or different,  
5 corresponding to formula (I):



(I)

in which:

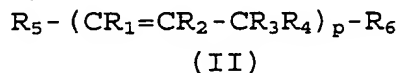
- 10 -  $R_1$  represents a hydrogen atom or a hydrocarbon-based group chosen from linear or branched alkyl groups containing from 1 to 20 carbon atoms, cycloalkyl groups containing from 3 to 8 carbon atoms, alkoxy groups containing from 1 to 20 carbon atoms, aryl  
15 groups containing from 6 to 20 carbon atoms and aryloxy groups containing from 6 to 20 carbon atoms;
- $R_2$  represents a halogen atom or a hydrocarbon-based group chosen from linear or branched alkyl groups containing from 1 to 20 carbon atoms, cycloalkyl  
20 groups containing from 3 to 8 carbon atoms, alkoxy groups containing from 1 to 20 carbon atoms, aryl groups containing from 6 to 20 carbon atoms and aryloxy groups containing from 6 to 20 carbon atoms;
- the radicals  $R_3$  and  $R_4$ , which may be identical or  
25 different, correspond to the same definition as  $R_1$ , on condition that at least one of the radicals  $R_3$  and  $R_4$  represents, in each unit, a hydrogen atom;
- the said radicals  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  possibly comprising, when they represent a hydrocarbon-based group, one or  
30 more substituents chosen from halogen groups, alkyl groups of 1 to 20 carbon atoms, alkoxy groups of 1 to

20 carbon atoms, aryl groups of 6 to 20 carbon atoms, aryloxy groups of 6 to 20 carbon atoms and amino groups.

5                   2. Polymer according to Claim 1, in which the sequence of units of formula (I) comprises at least one group chosen from C=O, C=NOH and CHOH, and the linear or branched alkylenediyl groups containing from 4 to 20 carbon atoms, and mixtures thereof.

10

3. Polymer according to Claim 1, corresponding to formula (II) below:



15 in which the radicals  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  are as defined in claim 1,  $R_5$  represents a linear or branched alkyl group containing from 1 to 20 carbon atoms, a cycloalkyl group containing from 3 to 20 carbon atoms or an aryl group containing from 6 to 20 carbon atoms,  
20  $R_6$  represents an - OH, primary amine, thiol -SH, halogen or -CHO group, a group derived from -CHO, an ester group, an optionally substituted amide group or an azide group -N<sub>3</sub>, and p is an integer ranging from 4 to 10 000.

25

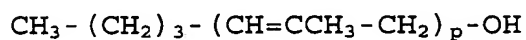
4. Polymer according to Claim 3, in which the radicals  $R_1$ ,  $R_3$  and  $R_4$  represent a hydrogen atom.

5. Polymer according to Claim 3 or 4, in  
30 which  $R_2$  represents an alkyl group containing from 1 to 20 carbon atoms.

6. Polymer according to any one of Claims 3 to 5, in which  $R_5$  represents an alkyl group containing from 1 to 20 carbon atoms.

5

7. Polymer corresponding to formula (III) below:



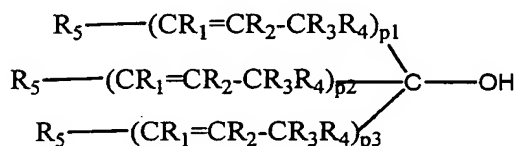
10

(III)

$p$  being an integer ranging from 4 to 10 000.

8. Polymer corresponding to the following formula:

15

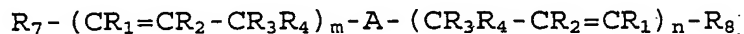


the radicals  $R_5$ , which may be identical or different, corresponding to the same definition as that of Claim 3, and  $p_1$ ,  $p_2$  and  $p_3$ , which may be identical or different, are integers ranging from 2 to 5000.

20

9. Polymer according to Claim 2, corresponding to formula (IV) below:

25



(IV)

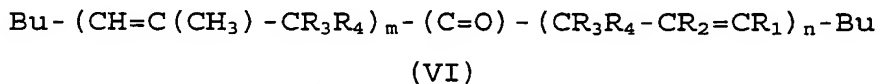
in which the radicals  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  are as defined in claim 1, A represents a C=O group, a CO derivative or -CHOH group, and the radicals  $R_7$  and  $R_8$ , which may be

identical or different, represent a linear or branched alkyl group containing from 1 to 20 carbon atoms, a cycloalkyl group containing from 3 to 20 carbon atoms or an aryl group containing from 6 to 20 carbon atoms,  
 5 m is an integer ranging from 2 to 5000 and n is an integer ranging from 2 to 5000.

10. Polymer according to Claim 9, in which A is a C=O group .

10

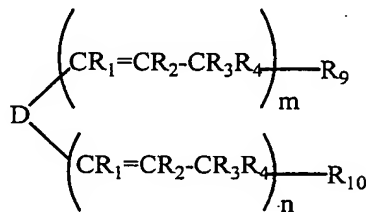
11. Polymer of formula (VI) below:



Bu representing the linear butyl group.

15

12. Polymer according to Claim 2, corresponding to formula (VII):



(VII)

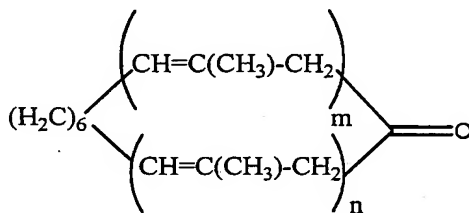
20 in which:

- the radicals  $\text{R}_1$ ,  $\text{R}_2$ ,  $\text{R}_3$  and  $\text{R}_4$  correspond to the same definition as that given in Claim 1 and m and n to the same definition as that given in Claim 9, and;
- the radicals  $\text{R}_9$  and  $\text{R}_{10}$ , which may be identical or  
 25 different, represent an OH,  $\text{NH}_2$ , SH, optionally substituted amide or -CHO group, a group derived from -CHO, an ester group, an optionally substituted amide group or an azide group  $-\text{N}_3$ ; or

- R<sub>9</sub> and R<sub>10</sub> together form a -C(=O)- group, a group derived from CO or a -CHOH- group;
- D represents a linear or branched alkylenediyl group containing from 4 to 20 carbon atoms, possibly comprising in its chain one or more heteroatoms chosen from oxygen, sulfur and nitrogen, m is an integer ranging from 2 to 5000 and n is an integer ranging from 2 to 5000.

10 13. Polymer according to Claim 12, in which  
D represents a linear or branched alkylene group  
containing from 4 to 20 carbon atoms and R<sub>9</sub> and R<sub>10</sub>  
together form a C=O group .

15                    14. Polymer of formula (IX) below,

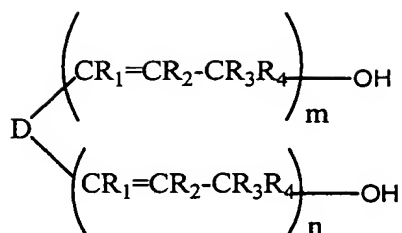


(IX)

with  $m$  and  $n$  being as defined in Claim 12.

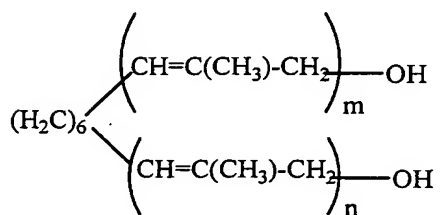
15. Polymer according to Claim 12, in which  
D represents a linear or branched alkylene group  
containing from 4 to 20 carbon atoms and R<sub>9</sub> and R<sub>10</sub> both  
represent an OH group, in which case the corresponding  
polymer is a linear polymer corresponding to formula  
(X) below:

25 (X) below:



(X)

16. Polymer of formula (XI)

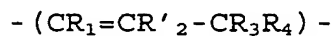


(XI)

m and n being as defined in Claim 12.

17. Polymer according to any one of the preceding claims, having E stereochemistry of the double bonds.

18. Process for preparing a polymer whose skeleton comprises a sequence of units of formula (I'):



(I')

in which:

- R<sub>1</sub> represents a hydrogen atom or a hydrocarbon-based group chosen from linear or branched alkyl groups containing from 1 to 20 carbon atoms, cycloalkyl groups containing from 3 to 8 carbon atoms, alkoxy groups containing from 1 to 20 carbon atoms, aryl groups containing from 6 to 20 carbon atoms and aryloxy groups containing from 6 to 20 carbon atoms;

- R'<sub>2</sub> represents a hydrogen or halogen atom or a hydrocarbon-based group chosen from linear or branched alkyl groups containing from 1 to 20 carbon atoms, cycloalkyl groups containing from 3 to 8 carbon atoms, alkoxy groups containing from 1 to 20 carbon atoms, aryl groups containing from 6 to 20 carbon atoms and aryloxy groups containing from 6 to 20 carbon atoms;
  - the radicals R<sub>3</sub> and R<sub>4</sub>, which may be identical or different, correspond to the same definition as R<sub>1</sub>, on condition that at least one of the radicals R<sub>3</sub> and R<sub>4</sub> represents, in each unit, a hydrogen atom;
- the said radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> possibly comprising, when they represent a hydrocarbon-based group, one or more substituents chosen from halogen groups, alkyl groups of 1 to 20 carbon atoms, alkoxy groups of 1 to 20 carbon atoms, aryl groups of 6 to 20 carbon atoms, aryloxy groups of 6 to 20 carbon atoms and amino groups,
- the said process comprising a step consisting in reacting, in suitable amount:
- at least one compound of ylide type corresponding to formula (2) below:



in which the radicals R<sub>1</sub>, R'<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> correspond to the same definition as that given above, E being a leaving group,

- with a trivalent boron compound, comprising at least one group capable of migrating, so

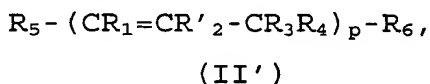
as to obtain the said sequence of units of formula (I') as defined above.

19. Process according to Claim 18, in which  
5 the group capable of migrating is a group chosen from linear or branched alkyl groups containing from 1 to 20 carbon atoms, with the exception of branched alkyl groups linked to boron via a tertiary carbon.

10 20. Process according to Claim 18 or 19, in which the leaving group E is chosen from  $N_2$ ,  $S(R)_2$ ,  $S(O)(R)_2$ ,  $N(R)_3$ ,  $AsAr_3$  and  $PAR_3$ , in which Ar represents a phenyl group optionally substituted with methyl or methoxy groups and R is an alkyl group.

15 21. Process according to any one of Claims 18 to 20, in which the ylide compound is methallyl-triphenylarsonium ylide.

20 22. Process for preparing a polymer corresponding to formula (II') below:

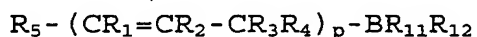


25 with the radicals  $R_1$ ,  $R'_2$ ,  $R_3$  and  $R_4$  having the same definition as that of Claim 18, and  $R_5$ ,  $R_6$  and p having the same definition as that of Claim 3, the said process comprising a step of reacting, in suitable amount:

- a boron compound of formula (1)  $R_5 - BR_{11}R_{12}$  with  $R_5$   
30 having the same definition as that given in Claim 3 and representing the group capable of migrating,  $R_{11}$  and  $R_{12}$ , which may be identical or different, possibly:



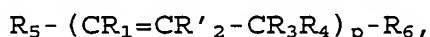
- representing a branched alkyl group linked to the boron via a tertiary carbon containing from 4 to 20 carbon atoms, an alkoxy group containing from 1 to 20 carbon atoms or an aryloxy group containing from 1 to 20 carbon atoms; or
- together forming a group -O-X-O-, in which X is a linear or branched alkylenediyl group containing from 2 to 6 carbon atoms
- with at least one allylic nucleophilic compound of the ylide type of formula (2) as defined in Claim 18, by means of which an intermediate of formula (XII) below is obtained:



(XII)  
the said process also comprising a step of converting the boron-based group into a suitable group  $R_6$ , by means of which the polymer of formula (II') defined above is obtained.

20

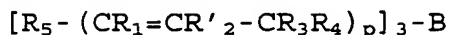
23. Process for preparing a polymer corresponding to formula (II') below:



(II')

25 with the radicals  $R_1$ ,  $R'_2$ ,  $R_3$  and  $R_4$  having the same definition as that of Claim 18, and  $R_5$ ,  $R_6$  and  $p$  having the same definition as that of Claim 3, the said process comprising a step of reacting, in suitable amount, a boron compound of formula  $(R_5)_3-B$  with  $R_5$   
30 having the same definition as that given above, with at least one allylic nucleophilic compound of the ylide type of formula (2) as defined in Claim 18, by

means of which an intermediate of formula (XIII) below is obtained:



5

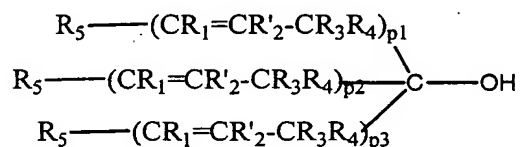
(XIII)

the said process also comprising a step of converting the boron-based group into a suitable group  $R_6$ , by means of which the polymer of formula (II') defined above is obtained.

10

24. Process according to Claim 23, in which the boron compound has the formula  $Bu_3B$  and the nucleophilic compound of ylide type is methallyltriphenylarsonium, by means of which the polymer of Claim 7 is obtained after a final step of conversion by treatment with aqueous hydrogen peroxide solution in basic medium.

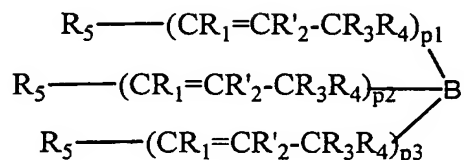
25. Process for preparing the polymer corresponding to the following formula:



the radicals  $R_5$ , which may be identical or different, corresponding to the same definition as that of Claim 3, and  $p_1$ ,  $p_2$  and  $p_3$ , which may be identical or different, being integers ranging from 2 to 5000, the said process comprising a step of reacting, in suitable amount, a boron compound of formula  $(R_5)_3-B$  with at least one allylic nucleophilic compound of the ylide type of formula (2) as defined in Claim 18, by means of

30

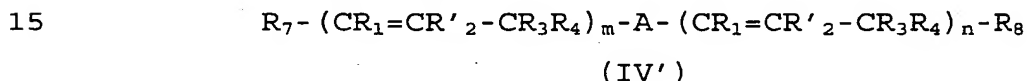
which an intermediate of formula (XIV) below is obtained:



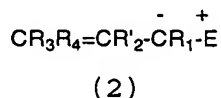
5 (XIV)

the said process also comprising a step of converting the boron-based group into a C-OH group by treatment of the intermediate compound (XIV) by heating in the presence of carbon monoxide, followed by a treatment  
10 with aqueous hydrogen peroxide solution in basic medium.

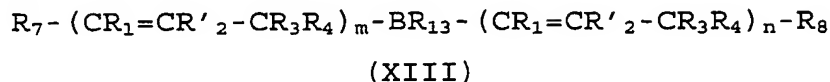
26. Process for preparing a polymer of formula (IV') below:



with  $\text{R}_1$ ,  $\text{R}'_2$ ,  $\text{R}_3$  and  $\text{R}_4$  having the same definition as that of Claim 18,  $\text{R}_7$ ,  $\text{R}_8$ , A, m and n having the same definition as that of Claim 9, the said process  
20 comprising the reaction of a boron compound of formula (6)  $\text{R}_7\text{---BR}_8\text{R}_{13}$  with  $\text{R}_7$  and  $\text{R}_8$  having the same definition as that given above,  $\text{R}_{13}$  being a branched alkyl group linked to the boron via a tertiary carbon containing from 4 to 20 carbon atoms, or an alkoxy or aryloxy  
25 group containing from 1 to 20 carbon atoms, with at least one allylic nucleophilic compound of the ylide type of formula (2):

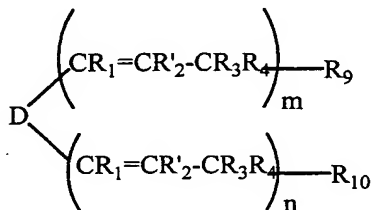


as defined in Claim 18, by means of which a derivative of formula (XIII) is obtained:



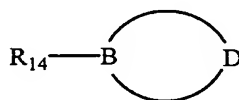
- 5 followed by a reaction for conversion of the group  $BR_{13}$  into a suitable group A.

27. Process for preparing a polymer of formula (VII') below:



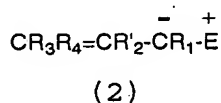
(VII')

- 10 with the radicals  $R_1$ ,  $R'_2$ ,  $R_3$  and  $R_4$  having the same definition as that of Claim 18,  $R_9$ ,  $R_{10}$ ,  $D$ ,  $m$  and  $n$  having the same definition as that of Claim 12, the
- 15 said process comprising a step of reacting a cyclic boron compound of formula (7):

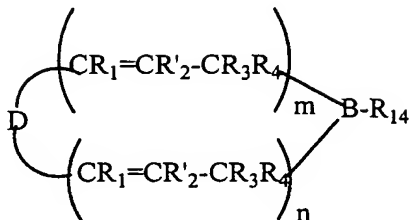


- 20  $R_{14}$  representing a group chosen from branched alkyl groups linked to boron via a tertiary carbon containing from 4 to 20 carbon atoms, or alkoxy or aryloxy groups containing from 1 to 20 carbon atoms,

with at least one nucleophilic compound of ylide type of formula (2):



as defined in Claim 18, in order to obtain a derivative of formula (XIV):



(XIV)

5 followed by a step of conversion of the group  $BR_{14}$  into suitable groups  $R_9$  and  $R_{10}$ .

28. Process according to Claim 27, in which the cyclic boron compound is B-thexylborepane and the  
 10 nucleophilic compound of ylide type is methallyltriphenylarsonium, by means of which the polymer of formula (XI) of Claim 16 is obtained after a step of conversion via the action of aqueous hydrogen peroxide solution in basic medium.

15

29. Process according to Claim 27, in which the cyclic boron compound is B-thexylborepane and the  
 nucleophilic compound of ylide type is methallyltriphenylarsonium, by means of which the  
 20 polymer of formula (IX) of Claim 14 is obtained after a carbonylation step of conversion.